

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
10 August 2006 (10.08.2006)

PCT

(10) International Publication Number
WO 2006/083448 A1

(51) International Patent Classification:
F28F 9/04 (2006.01)

(21) International Application Number:
PCT/US2005/047362

(22) International Filing Date:
28 December 2005 (28.12.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/649,268 2 February 2005 (02.02.2005) US

(71) Applicant (for all designated States except US): **CARRIER CORPORATION** [US/US]; One Carrier Place, Farmington, CT 06034 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **GORBOUNOV, Mikhail B.** [US/US]; 521 Deming Street, South Windsor, CT 06074 (US). **SANGIOVANNI, Joseph J.** [US/US]; 150 South Stone Street, West Suffield, CT 06093-0363 (US). **VAISMAN, Igor B.** [CA/US]; 36 Old Meadow Road, West Hartford, CT 06117 (US).

(74) Agent: **HABELT, William W.**; 101 South Salina Street, 4th Floor, Syracuse, NY 13202 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AI, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MY, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

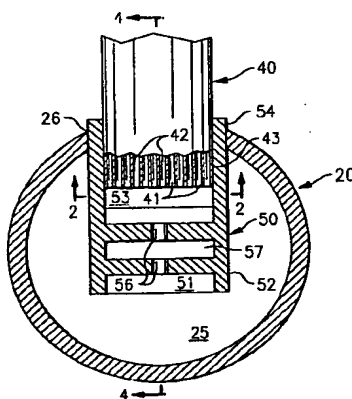
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SI, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **HEAT EXCHANGER WITH MULTIPLE STAGE FLUID EXPANSION IN HEADER**



(57) Abstract: A heat exchanger includes a plurality of flat, multi-channel heat exchange tubes extending between spaced headers. Each heat exchange tube has an inlet end in fluid flow communication with one of the headers and an outlet opening to the other header. Each heat exchange tube has a plurality of flow channels extending longitudinally in parallel relationship from its inlet end to its outlet end. A plurality of connectors are positioned between the inlet header and the heat transfer tubes to define a flow path providing fluid flow communication between the inlet header and the inlet ends of the heat exchange tubes. Two or more flow restriction ports are arranged in the series in the flow path through each connector whereby fluid flowing from the inlet header to the flow channels of the heat exchange tube associated therewith undergoes an expansion as the fluid passes through each flow restriction port.

WO 2006/083448 A1